Building a Teacher's Tool Box

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On the following pages, you will find notes that I took based on a webinar on dyslexia and the brain of a dyslexic person and how that impacts the teaching conducted in a class.

Once again, as I have found in the past, the information that is listed about teaching accommodations rings loud and clear for all students. Good teaching is good teaching, regardless of the students that you have seated in front of you.

The research on the brain was fascinating to me. I had never learned about dyslexia and the brain in this way. What an eye-opener as a teacher who has had students say that they have dyslexia to me. What a different perspective on dyslexia and how the brain interacts with the entire learning process. I hope that you find this information as interesting as I did.

Webinar conducted by NAASLN, or the National Association of Adults with Special Learning Needs
The Dyslexic Brain: Why Should Teachers Care? What Should They Know?

Presented by: Dr. Patricia Hardman

August 24, 2009

8 Reasons for not learning to read:

- ✓ Educationally deficient
- ✓ Culturally deprived
- ✓ Emotionally disturbed
- ✓ Neurological damage (pre-natal to death)
- ✓ Developmentally handicapped
- ✓ Physical impairment, such as blindness or deafness
- ✓ English as a Second Language (need to look at their ability to learn in their first language)
- ✓ Dyslexia

Dyslexia is misidentified as:

- ✓ Perceptual disability (the way information is seen and processed within in the brain)
- ✓ Auditory processing deficit (the way information is taken in by hearing and how it is processed within the brain)
- ✓ Specific Learning Disability
- ✓ ADHD/ADD
- ✓ Dysgraphia (inability to handwrite)
- ✓ Dysphasia (lose words, mispronounce words)
- ✓ Tactile defensive (certain textures, materials, and so on, cause distress to the individual)
- ✓ Visual processing deficit (how information is seen visually and processed within the brain)
- ✓ Behavioral disorder
- ✓ Lazy
- ✓ Spoiled
- ✓ Immature
- ✓ Asperger's Syndrome
- ✓ Bad attitude
- ✓ Daydreamer
- ✓ Lethargic

Dyslexia is defined as "an innate neurobiological difference that is manifested in language, visual processing, and auditory processing, and is biochemical."

Dyslexia affects language in both the literal and concrete form.

Learners have a difficult time getting to the abstract meaning and the nuances of language, and have great difficulty with jokes.

Learners with dyslexia have difficulty with perception, and the ability to interpret information in the areas of speaking, hearing, seeing, and also with past experiences. This perception can change under stress and fatigue.

Learners with dyslexia have difficulty in processing information. Learners have issues with speed and fluency.

Learners with dyslexia have differences in their biochemistry of their brain. It manifests itself in their autoimmune system, poor assimilations of nutrients, allergies, blood sugar, stress, and addictions.

Dyslexia affects:

Communication

- How much does communication have to do with words?
- Non-verbal body language and communication make up 55% of our communication process
- Learners with dyslexia need to learn to keep a "hand shake" distance from people.
- Have a problem with authority figures. Research shows that adults with dyslexia have an 80% rate of being arrested compared to adults who are not dyslexic.

Verbal qualities of speech

38% of adults with dyslexia have difficulty with:

- Tone
- Pitch
- Loudness
- Speed
- Accent
- Fluency

Words

7% of adults have difficulty retrieving words

Dyslexia is NOT just a reading disability

Dyslexia affects:

- ✓ All aspects of education
- ✓ Words
- ✓ Reading
- ✓ Health
- ✓ Life
- ✓ Career
- ✓ Math
- ✓ Spelling

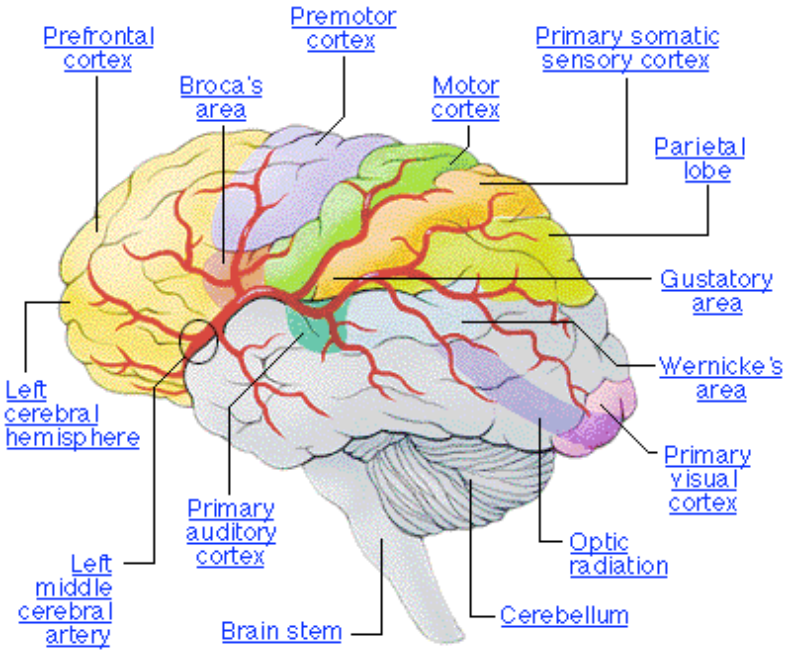
Learners with dyslexia have average to above average intellectual potential. As an educator, do not underestimate their ability.

Learners with dyslexia have varying levels of compensatory skills and abilities. Their reading, writing, math, and social skills vary between individuals. Individuals have strengths and weaknesses in all areas.

Learners with dyslexia have life long learning and language difficulties. They are difficulties, not disabilities. Learners need to learn skills to compete in the world of education and work.

Dyslexia can be masked. It is possible for the learner to not know that they have dyslexia.

The Brain and the Person with Dyslexia



Understanding the brain differences of individuals with dyslexia helps to understand that it is a learning difference, not a disability.

For reading problems, the parietal and occipital lobe of the brain do not function as they should.

The left angular gyrus, which is responsible for sound-symbol associations, also does not function as it should in learners with dyslexia.

In a learner with dyslexia, they access the pre-frontal area of the brain, which is responsible for executive functions. What this means is that the learner is always reading like a beginning reader since the reading process is step by step rather than becoming automatic and fluent.

Because a learner with dyslexia accesses the wrong part of the brain to read, it is difficult for them to learn something new. It is possible to learn something new, it just takes much more practice. If they "don't use it, they will lose it".

Research shows that the brain of a person with dyslexia possesses "ectopic neurons". This is the genetic factor to dyslexia.
In ectopic neurons, small bunches of neurons migrate to where they should NOT be. New cells begin to form that should not be where they are located. The neurons connect differently to different parts of the brain. The wrong cells are in the wrong place. This process begins before the second month of gestation.
There is a process of "pruning off" that the brain automatically does at six months of gestation, and also at two years of age. In this process, cells that are forming where they should not be, "prune off" like when a gardener prunes off the old branches or unwanted branches of a tree or plant. For the cells that are in the wrong place in the brain of a dyslexic person, this pruning off does NOT occur. The cells continue to form in the wrong place, and they are not discarded. Because of this, the brain does not form in the way it should, resulting in the person with dyslexia utilizing the wrong parts of the brain for reading.

The brain is symmetrical with the right and left hemispheres being of equal size. Each portion of the brain is to do their own job in combination with each other.
In a person with dyslexia, the reversal phenomenon of letters, b for d, p for q and so on, occurs because of the asymmetry of their brain. When the reversal of letters occurs, it is because the brain is not working together; one of the hemispheres is in control at that time.

A person with dyslexia has an uneven corpus callosum, which is the "divider" of the brain's hemispheres. The corpus callosum separates the two parts of the brain. There are patterns of electrical stimulation that occurs between the two halves. In a person with dyslexia, there is a decrease of this communication between the two halves of the brain.

Abnormal vasculature occurs in a person with dyslexia as well. The blood does not travel to the brain the way that it should. In this case, the person with dyslexia suffers migraines.

Different patterns of neural connections occur in a person with dyslexia. The chemistry in the brain is different than with a person without dyslexia. The synaptic connections, the axons and dendrites, which allow passage of information between brain cells does not operate the same in a person with dyslexia. The dendrites carry information to the brain cells, and the axons carry the information out of the brain cells. In a person with

dyslexia, their neurons and axons do not carry the information in this way. Their processing speeds decrease because of this "faulty wiring", and under increased stress, the dendrites decreases their activity.

According to research, chronic stress leads to chronic disease.
Stress equals distress.
Stress can be in the form of:

- ✓ Biochemical
- ✓ School
- ✓ Home
- ✓ Work
- ✓ Social

Research shows that diet and allergy control can help to diminish some stress and help the biochemical process to better regulate itself.

For a person with dyslexia, it is important for them to have a space where they have control over what is happening in their lives. This place should be accessed for at least ten minutes a day so they can compose themselves and quiet their brain down.

To help decrease stress, a person with dyslexia should participate in something that brings them success. They need to be able to succeed at something to feel that they can accomplish their learning. Some recommendations are sports and social affiliations.

The reticular activating system, which is located deep in the brain, is also affected in a person with dyslexia. This is the part of the brain that controls the excitatory and inhibitory parts of the brain. This part of the brain has been looked at through research and it is known that nutrition affects this part of the brain. Amino acids and proteins and carbohydrates affect the reticular activating system, as well as calcium. These foods help to maintain arousal to the task at hand. Research is being looked at to see if proper nutrition would help a person with dyslexia focus to the task at hand.

The thymus affects hearing and vision. In a person with dyslexia, the cells in the thymus do not work properly and result in a disruption in timing, irregular processing speed, and memory is also affected.

In a person with dyslexia, their brain is wired differently. The brain connections can be changed with proper training. Multi-sensory educational training will help a person with dyslexia "remake" the proper connections to access information that they are learning.

The ways to teach in a multi-sensory method is with auditory-motor activities, auditory activities, kinesthetic activities, and visual activities. In combination, they are more powerful in "remaking" the necessary connections to access information. Utilizing the senses in learning helps a person with dyslexia to process information. There is a continuum along the senses for best generalization of information from the learning place

to the everyday world. Kinesthetic or bodily is the highest, with sight, hearing and smelling ranking next.
Even with multi-sensory educational training, accessing information will take time, and even at times, the information will not be able to be accessed. Educators need to realize that they will have to reiterate information and that the student cannot maintain focus for extended periods of time. Educators also need to know that work level varies from time to time. Students with dyslexia are quick learners, and quick forgetters. They have difficulty hearing and also following directions. Students with dyslexia have a high IQ, but low memory ability.

A person with dyslexia needs to understand that their brain is wired differently and that they do have problems with understanding concepts, with remembering concepts, and with figuring things out.

A person with dyslexia needs to know that it is neurobiological, genetic, and that there are biochemical differences in their brain, as compared to people who do not have dyslexia. They need to understand that it is at a cellular level in which they have dyslexia.
A person with dyslexia also needs to know that research shows that they have a greater chance of developing allergies, nutrition difficulties, and addictions.
A person with dyslexia needs to realize that they will have difficulty with word finding, pronunciation, and articulation. They will have difficulty generalizing and applying rules. They may have social and behavioral problems.

Ideas to help student with dyslexia are:

- ✓ Organization is key for a student with dyslexia. Realize that a student what dyslexia loses track of time. The future does not exist. Impose organization within the classroom.
- ✓ Students must be taught how to take notes.
- ✓ Teachers need to know that no skill can be taken for granted. All skills must be taught explicitly. "Tell, model, and practice".
- ✓ Be brief.
- ✓ Have the student repeat information back.
- ✓ Teach in different ways to increase retention.
- ✓ Break tasks down into smaller steps, or chunks.
- ✓ Do manageable tasks based on ability.
- ✓ Impose routines, checklists, and consistency in the classroom.
- ✓ Be patient with the student, and tell the student to be patient with themselves.
- ✓ Set realistic goals.
- ✓ Encourage persistence.
- ✓ Identify what is done correctly.
- ✓ Teach the student to apply all skills learned within the classroom to generalize to the workplace.